

23347.PCT,US
09/830,399

CLAIM AMENDMENTS

1. (Currently Amended) A process for forming a nanosize ceramic powder comprising:

forming a precursor ceramic material comprising a fugitive constituent and a non-soluble constituent in a single phase;

decomposing the fugitive constituent to leave the non-soluble constituent by contacting the precursor ceramic material with a selective solvent to form a solution of the fugitive constituent in the solvent and a non-dissolved residue of the non-soluble constituent,

the precursor ceramic material being sufficiently reactive with the solvent to form the solution of the fugitive constituent in the solvent and form the non-dissolved residue of the non-soluble constituent,

the precursor ceramic material and the non-soluble dissolved residue being sufficiently insoluble in the solvent such that there is essentially no precursor ceramic material and non-soluble dissolved residue in the solution that will deposit and precipitate upon the residue of the non-soluble constituent,

the fugitive constituent being sufficiently soluble in the solvent such that the decomposing is without deposition or precipitation of dissolved fugitive constituent upon the residue of the non-soluble constituent,

removing the solution of the fugitive constituent from the residue to form a nanosize powder of the residue of the non-soluble constituent.

2. (Currently Amended) The process as in Claim 1 wherein the precursor ceramic material is $\text{BaCe}_{1-x}\text{RE}_x\text{O}_{3-\delta}$ or $\text{SrCe}_{1-x}\text{RE}_x\text{O}_{3-\delta}$ and the composition of the nanosize powder is $\text{Ce}_{1-x}\text{RE}_x\text{O}_{2-\delta}$ where RE is a rare earth metal or Y, x is between 0 and about 0.25, and δ is between 0 and about 0.13.

23347.PCT.US
09/830,399

3 (Currently Amended) The process as in Claim 1 wherein the precursor ceramic material is $\text{SrZr}_{1-x}\text{RE}_x\text{O}_{3.5}$ or $\text{BaZr}_{1-x}\text{RE}_x\text{O}_{3.5}$, $\text{BaZr}_{1-x}\text{RE}_x\text{O}_{3.5}$, and the composition of the nanosize powder is $\text{Zr}_{1-x}\text{RE}_x\text{O}_{2.5}$, where RE is a rare earth metal or Y, x is between 0 and about 0.25, and δ is between 0 and about 0.13.

4. (Original) The process as in Claim 1 wherein the composition of the resultant-nanosize powder is Al_2O_3 .

5. (Currently Amended) The process as in Claim 3 wherein the precursor ceramic material is selected from the group consisting of BaAl_2O_6 , $\text{Ba}_3\text{Al}_2\text{O}_9$, and NaAlO_2 .

6. (Currently Amended) The process as in Claim 1 wherein the composition of the resultant-nanosize powder is Cr_2O_3 .

7. (Currently Amended) The process as in Claim 6 wherein the precursor ceramic material is MgCr_2O_4 .

8. (Currently Amended) The process as in Claim 1 wherein the composition of the resultant-nanosize powder is ZrO_2 .

9. (Currently Amended) The process as in Claim 8 wherein the precursor ceramic material is BaZrO_3 .

10. (Currently Amended) The process as in Claim 1 wherein the composition of the resultant-nanosize powder is TiO_2 .

11. (Currently Amended) The process as in Claim 10 wherein the precursor ceramic material is MgTiO_3 or Mg_2TiO_4 .

12. (Original) The process as in Claim 1 wherein the composition of the non-soluble constituent and the nanosize powder is V_2O_5 .

13. (Currently Amended) The process as in Claim 12 wherein the precursor

Page 3 of 7

23347.PCT.US
09/830,399

ceramic material is $\text{Na}_2\text{V}_2\text{O}_7 \cdot \text{Na}_2\text{V}_2\text{O}_7$.

14. (Original) The process as in Claim 1 wherein the selective solvent is water.

15. (Currently Amended) A process for forming a nanosize ceramic powder comprising:

forming a precursor ceramic material comprising a fugitive constituent and a non-soluble constituent in a single phase;

decomposing the fugitive constituent to leave the non-soluble constituent by contacting the precursor ceramic material with a selective solvent to form a solution of the fugitive constituent in the solvent and a non-dissolved residue of the non-soluble constituent, the precursor ceramic material being sufficiently reactive with the solvent to form the solution of the fugitive constituent in the solvent and form the non-dissolved residue of the non-soluble constituent,

the precursor ceramic material and the non-soluble dissolved residue being sufficiently insoluble in the solvent such that there is essentially no precursor ceramic material and non-soluble dissolved residue in the solution that will deposit and precipitate upon the residue of the non-soluble constituent,

the fugitive constituent being sufficiently soluble in the solvent such that the decomposing is without deposition or precipitation of dissolved fugitive constituent upon the residue of the non-soluble constituent,

removing the solution of the fugitive constituent from the residue to form a nanosize powder of the residue of the non-soluble constituent, where the selective solvent is an acid.

16. (Currently Amended) The process as in Claim 15 wherein the acid is selected from the group consisting of HNO_3 , HCl , H_2CO_3 and H_2SO_4 .

23347.PCT.US
09/830,399

17. (Currently Amended) The process as in Claim 15 wherein the acid is contacted with the precursor ~~ceramic material is with an acid gas.~~

18. (Currently Amended) The process as in Claim 17 wherein the acid gas is SO_3 , N_2O_5 , CO_2 or HCl/HCl .

19. (Original) The process as in Claim 1 wherein the selective solvent is a reacting gas dissolved in a non-aqueous polar solvent.

20. (Currently Amended) The process as in Claim 19 wherein the polar solvent is selected from the group consisting of formamide, N-Methyl-acetamide, N-Methyl-formamide, N-Methyl-propionamide, propylene carbonate, and ethylene carbonate, and the reacting gas is selected from the group consisting of CO_2 , SO_3 , SO_2 ~~acid and~~ N_2O_5 .

21. (Canceled)

22. (Canceled)

23. (Canceled)

24. (Canceled)

25. (Canceled)